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Joseph R. Kelly
WESTMAN CHAMPLIN & KELLY
Suite 1600 - International Centre
900 South Second Avenue
Minneapolis, MN 55402-3319

EXAMINER	
LAO, TIM P	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/804,117	Applicant(s) THRASHER ET AL.	
	Examiner Tim Lao	Art Unit 2655	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 March 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-41* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

On page 5, line 15, "block 304" should be changed to -- block 305 --.

On page 30, line 24 and 27, "hypothesis 7" should be changed to -- hypothesis 8 --. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-41 are rejected under 35 U.S.C. 102(e) as being anticipated by Tran et al. (U.S. Patent 5,987,409, hereinafter "Tran").	
Claim(s) 1	Tran discloses: A method of generating alternatives to words indicative of recognized speech, recognized based on input speech data (col.1, ll.61-67), comprising: generating a reference path (Fig.1: K1-K8-K10-K12) of recognized words based on the input speech data; (Fig.1&2; col.2, ll.1-8; col.3, ll.28-33; col.4, ll.12-16) *{Fig.1 shows a word graph of different word sequences that include a reference path (= K1-*

	K8-K10-K12 = first word sequence) and alternative paths.} receiving an operator selection input indicative of a selected portion (e.g., K8-K10) of the recognized speech for which alternatives (e.g., K7-K11) are to be generated; (see Fig.1; col.3, ll.29-63) *{In Fig.1 for example, K7 is an alternative for K8, K11 for K10, K7-K11 for K8-K10, K9 is for K8, and so forth.}* calculating boundary conditions (t3, t6) for alternatives (K7-K11) based on position bounds (t3, t6) of a reference subpath (K8-K10) corresponding to the selected portion of the recognized speech; and constructing from a hypothesis store, corresponding to the input speech data, alternate subpaths (K8-K10) satisfying the boundary conditions (t3, t6). *{K7-K11 is an alternative (hypothesis) for K8-K10.}*
Claim(s) 2	Tran discloses: The method of claim 1 wherein calculating the boundary conditions comprises: determining the position bounds of the reference subpath by identifying, as a beginning boundary condition, a beginning time (t0) in the reference path (K1-K8-K10-K12) of a first boundary word (K1), the first boundary word (K1) preceding the selected portion (K8-K10) of the recognized speech. (see Fig.1)
Claim(s) 3	Tran discloses: The method of claim 2 wherein calculating the boundary conditions comprises: determining the temporal bounds of the reference subpath by identifying, as an ending boundary condition, an ending time (t8) in the reference path (K1-K8-K10-K12) of a second boundary word (K12), the second boundary word (K12) following the selected portion (K8-K10) of the recognized speech. (see Fig.1)
Claim(s)	Tran discloses:

4	The method of claim 3 wherein the hypothesis store includes a word hypothesis lattice (e.g., K1-K8-K10-K12; K2-K5-K9-K10-K13-K16) indicative of entries for a plurality of alternate words corresponding to utterances in the input speech data, each entry including a lexical word (e.g., K1, K12), a beginning time (t0 for K1, t6 for K12) in the input speech data corresponding to the lexical word and an ending time (t3 for K1, t8 for K12) in the speech data corresponding to the lexical word, and wherein constructing alternate subpaths comprises: obtaining from the hypothesis lattice instances of the first boundary word (K1) that satisfy the beginning boundary condition (t0). (see Fig.1)
Claim(s) 5	Tran discloses: The method of claim 4 wherein constructing alternate subpaths comprises: concatenating to each of the instances of the first boundary word (e.g., K1, K2, K3) a string of one or more additional words (e.g., K8-K10-K12 for K1; K4-K9-K10-K12 for K2; K5-K10-K13-K17 for K3), wherein the string of one or more additional words satisfies the ending boundary condition (t8). (see Fig.1)
Claim(s) 6	Tran discloses: The method of claim 5 wherein constructing alternate subpaths comprises: concatenating to each of the instances of the first boundary word (e.g., K1) a string of one or more additional words (e.g., K8-K10-K12), wherein the string of one or more additional words ends in an instance of the second boundary word (K12) that satisfies the ending boundary condition (t8). (see Fig.1)
Claim(s) 7	Tran discloses: The method of claim 5 wherein concatenating comprises: for each instance of the first boundary word (e.g., K1), obtaining from the hypothesis lattice one or more instances of a first intermediate word (e.g., K7) having a beginning time

	(t3) corresponding to an ending time (t3) of the first boundary word (K1) and having an ending time (N6). (see Fig.1)
Claim(s) 8	Tran discloses: The method of claim 7 wherein concatenating further comprises: continuously concatenating additional words (e.g., K11-K12) until an alternate path is formed satisfying the boundary conditions (t0, t8), each of the additional words (e.g., K11, K12) having a beginning time (N6 for K11, t6 for K12) corresponding to an ending time (N6, t6) of a preceding word (K7, K11) and an ending time (t6, t8) corresponding to a beginning time of a subsequent word (K12). *{t8 would correspond to a beginning time of a subsequent word if the word graph continues.}*
Claim(s) 9	Tran discloses: The method of claim 1 wherein constructing alternate subpaths comprises: beginning construction of up to a predetermined number, X, of hypothesis alternate subpaths; (see Fig.1) and *{Fig.1 shows a predetermined number of alternate subpaths.}* assigning each hypothesis alternate subpath a score that is updated as the hypothesis alternate subpath is constructed. (col.3, ll.55-58; col.2, ll.14-24, ll.44-50) *{The score is incrementally added and increased as the alternate subpath is constructed.}*
Claim(s) 10	Tran discloses: The method of claim 9 wherein assigning a score comprises: computing an actual score for the alternate subpath through a temporal point (a node) to which the hypothesis alternate subpath is constructed; and computing an estimated score, estimating a score associated with a remainder of the hypothesis alternate subpath to be computed. (col.3, ll.55-58; col.2, ll.14-24, ll.44-50) *{The score is incrementally added and increased as the alternate subpath is constructed.}*

Claim(s) 11	Tran discloses: The method of claim 10 wherein computing an actual score comprises: computing the actual score as a combination of acoustic scores (col.5, ll.23-29) for words in the hypothesis alternate subpath and language model scores (col.2, ll.32-35) for the words in the hypothesis alternate subpath.
Claim(s) 12	Tran discloses: The method of claim 11 wherein computing an estimated score comprises: computing the estimated score as a portion of a reference score assigned to the reference path, the portion of the reference score corresponding to an amount of the hypothesis alternate subpath left to be computed in relation to an overall length of the hypothesis alternate subpath. (col.5, ll.57-66) *{The score of the reference is computed first. Subsequently, the scores of the alternate subpaths are incrementally computed.}*
Claim(s) 13	Tran discloses: The method of claim 9 wherein constructing alternate subpaths comprises: after beginning construction of each of the X hypothesis alternate subpaths (Fig.1), beginning construction of a hypothesis alternate subpath only if its score is one of the top X scores (Fig.3; col.4, ll.52-53); and *{1. Fig.1 shows a predetermined number of alternate subpaths.* *2. Fig.3 shows the top 4 sequences.}* discontinuing construction of all hypothesis alternate subpaths having a score not in the top X scores. (Fig.3) *{The alternate subpaths with scores below the top 4 sequences are not constructed.}*
Claim(s) 14	Tran discloses:

	The method of claim 13 wherein constructing alternate subpaths comprises: when construction of X hypothesis alternate subpaths has begun, sorting the hypothesis alternate subpaths by score. (col.2, ll.14-24) *{The scores is incrementally added and increased to represent for example the top 4 sequences as shown in Fig.3}*
Claim(s) 15	Tran discloses: The method of claim 14 wherein constructing alternate subpaths comprises: retaining hypothesis alternate subpaths having the top X scores (e.g., top 4) as the alternate subpaths. (Fig.3)
Claim(s) 16	Tran discloses: The method of claim 15 and further comprising: presenting the alternate subpaths to the user. (col.6, ll.31-42)
Claim(s) 17	Tran discloses: The method of claim 1 wherein constructing alternate subpaths comprises: constructing alternate subpaths that are lexically different from the reference subpath. (Fig.1; col.3, ll.28-63)
Claim(s) 18	Tran discloses: The method of claim 17 wherein, when fewer than a predetermined number of lexically different alternate subpaths can be constructed, extending the boundary conditions and constructing alternate subpaths satisfying the extended boundary conditions. (Fig.1) *{K7 is an alternate subpath for K8. The boundary of K7 is extended from t5 to N6. K11 subpath is constructed to satisfy N6 and t6.}*

Claim(s) 19	Tran discloses: The method of claim 1 wherein constructing the alternate subpaths begins in response to the operator selection input. (col.6, ll.36-42)
Claim(s) 20	Tran discloses: A method of generating alternate speech recognitions for speech data input by an application (col.1, ll.61-67), comprising: receiving the speech data (Fig.4: **10**) at a speech recognition engine (Fig.4: **14**); generating a reference speech path (Fig.1: K1-K8-K10-K12) and a hypothesis lattice (e.g., K1-K8-K10-K12; K2-K5-K9-K10-K13-K16) based on the speech data, the hypothesis lattice representing alternate recognition paths corresponding to the speech data, the hypothesis lattice including a plurality of entries (e.g., K1, K8, K10, K12), each entry including an instance of a lexical word, a starting point (e.g., t0, t3, t5, t6) in the speech data of the instance of the lexical word, an ending point (e.g., t3, 5, t6, t8) in the speech data of the instance of the lexical word, and a score (col.3, ll.55-58) associated with the instance of the lexical word; (col.5, ll.57-61) storing the hypothesis lattice with the application; (col.5, ll.57-67; col.6, ll.1-16) receiving a user selection input indicative of a portion of the reference speech path to be corrected; (col.5, ll.38-52; col.6, ll.31-42) *{The errors corresponding to the portion of the displayed on the screen so that the user can select the portion of the error to which correction is to be made.}* in response to the user selection input, accessing the retrieved hypothesis lattice with the speech recognition engine; (col.6, ll.22-30) and constructing, at the engine, alternate subpaths to replace portions of the reference speech path based on the hypothesis lattice. (col.5, ll.52-56)
Claim(s)	Tran discloses:

21	The method of claim 20 and further comprising: presenting the alternate subpaths to the user. (col.6, ll.31-42)
Claim(s) 22	Tran discloses: The method of claim 20 wherein constructing alternate subpaths comprises: calculating boundary conditions (t3, t6) for alternatives (K7-K11) based on temporal bounds (t3, t6) of a reference subpath (K8-K10) corresponding to the selected portion of the reference speech path; and constructing from the hypothesis lattice alternate subpaths (K8-K10) satisfying the boundary conditions (t3, t6). *{K7-K11 is an alternative (hypothesis) for K8-K10.}*
Claim(s) 23	Tran discloses: The method of claim 22 wherein calculating the boundary conditions comprises: determining the temporal bounds of the reference subpath by identifying, as a beginning boundary condition, a beginning time (t0) in the reference speech path (K1-K8-K10-K12) of a first boundary word (K1), the first boundary word (K1) preceding the selected portion (K8-K10) of the reference speech path. (see Fig.1)
Claim(s) 24	Tran discloses: The method of claim 23 wherein calculating the boundary conditions comprises: determining the temporal bounds of the reference subpath by identifying, as an ending boundary condition, an ending time (t8) in the reference speech path (K1-K8-K10-K12) of a second boundary word (K12), the second boundary word (K12) following the selected portion (K8-K10) of the reference speech path. (see Fig.1)
Claim(s)	Tran discloses:

25	A speech recognition system (Fig.4) for receiving a speech input (Fig.4: **10**) and generating recognition data indicative of words recognized in the speech data (Fig.4: **14**), and for generating alternates to words in the recognition data (Fig.4: **14**), comprising: a decoder (Fig.4: **20**) generating a reference path (Fig.1: K1-K8-K10-K12) including likely words in the speech data and a hypothesis lattice indicative of hypotheses generated based on the speech data; (Fig.1; col.5, ll.57-60) and an alternative generator (Fig.4: **20**), coupled to the decoder, configured to receive the reference path (Fig.1: K1-K8-K10-K12) and a user selected portion (e.g., K8-K10) of the reference path to be changed, and to calculate boundary conditions (t3, t6) for the selected portion of the reference path to obtain a reference subpath (K8-K10) and access the hypothesis lattice to generate alternative subpaths (e.g., K7-K11) to replace the reference subpath based on the boundary conditions (t3, t6) calculated.
Claim(s) 26	Tran discloses: The speech recognition system of claim 25 wherein the alternative generator comprises: a boundary calculator configured to receive the user selected portion of the reference path (e.g., K8-K10) and calculate the boundary conditions (t3, t6) for alternative subpaths (K7-K11) based on a location (t3, t6) of the reference subpath in the reference path. (see Fig.1)
Claim(s) 27	Tran discloses: The speech recognition system of claim 26 wherein the alternative generator comprises: a plurality of construction components coupled to the boundary calculator and configured to construct the alternate subpaths (K7-K11) by obtaining hypotheses from the hypothesis lattice that satisfy the boundary conditions (t3, t6). (see Fig.1)

Claim(s) 28	Tran discloses: The speech recognition system of claim 27 wherein the boundary calculator is configured to determining position bounds of the reference subpath in the reference path (K1-K8-K10-K12) by identifying, as a beginning boundary condition, a beginning position (t0) in the reference path (K1-K8-K10-K12) of a first boundary word (K1), the first boundary word (K1) preceding the user selected portion (K8-K10) of the reference path. (see Fig.1)
Claim(s) 29	Tran discloses: The speech recognition system of claim 28 wherein the boundary calculator is configured to determine the position bounds of the reference subpath by identifying, as an ending boundary condition, an ending position (t8) in the reference path (K1-K8-K10-K12) of a second boundary word (K12), the second boundary word (K12) following the user selected portion (K8-K10) of the reference path. (see Fig.1)
Claim(s) 30	Tran discloses: The speech recognition system of claim 29 wherein the hypothesis lattice includes a word hypothesis lattice (e.g., K1-K8-K10-K12; K2-K5-K9-K10-K13-K16) indicative of entries for a plurality of alternate words corresponding to utterances in the speech data, each entry including a lexical word (e.g., K1, K12), a beginning position (t0 for K1, t6 for K12) in the input speech data corresponding to the lexical word and an ending position (t3 for K1, t8 for K12) in the speech data corresponding to the lexical word. (see Fig.1)
Claim(s) 31	Tran discloses: The speech recognition system of claim 30 wherein construction components are configured to obtaining from the hypothesis lattice instances of the first boundary word (K1) that satisfy the beginning boundary condition (t0). (see Fig.1)
Claim(s) 32	Tran discloses: The speech recognition system of claim 31 wherein the construction components include:

	a path extender configured to generate an array of word records forming a concatenation to each of the instances of the first boundary word (e.g., K1, K2, K3) a string of one or more additional words (e.g., K8-K10-K12 for K1; K4-K9-K10-K12 for K2; K5-K10-K13-K17 for K3), wherein the string of one or more additional words satisfies the ending boundary condition (t8). (see Fig.1)
Claim(s) 33	Tran discloses: The speech recognition system of claim 32 wherein each of the word records includes an indication of the additional word (e.g., K8-K10-K12 for K1; K4-K9-K10-K12 for K2; K5-K10-K13-K17 for K3) represented by the word record, preceding word data indicative of preceding words such that a language model score (col.3, ll.55-58) can be calculated, and a pointer to a preceding word record in the array forming part of the alternate subpath being constructed. (see Fig.1)
Claim(s) 34	Tran discloses: The speech recognition system of claim 31 wherein the construction components comprise: a path extender configured to generate an array of word records forming a concatenation to each of the instances of the first boundary word (e.g., K1) a string of one or more additional words (e.g., K8-K10-K12), wherein the string of one or more additional words ends in an instance of the second boundary word (K12) that satisfies the ending boundary condition (t8). (see Fig.1)
Claim(s) 35	Tran discloses: The speech recognition system of claim 32 wherein the path extender is configured to generate the array of word records by, for each instance of the first boundary word (e.g., K1), obtaining from the hypothesis lattice one or more instances of a first intermediate word (e.g., K7) having a beginning time (t3) corresponding to an ending time (t3) of the first boundary word (K1) and laving an ending time (N6). (see Fig.1)

Claim(s) 36	Tran discloses: The speech recognition system of claim 35 wherein the path extender is configured to continuously concatenate additional words (e.g., K11-K12) until an alternate subpath is formed satisfying the boundary conditions (t0, t8), each of the additional words (e.g., K11, K12) having a beginning time (N6 for K11, t6 for K12) corresponding to an ending time (N6, t6) of a preceding word (K7, K11) and an ending time (t6, t8) corresponding to a beginning time of a subsequent word (K12). *{t8 would correspond to a beginning time of a subsequent word if the word graph continues.}*
Claim(s) 37	Tran discloses: The speech recognition system of claim 36 wherein the construction components further include a scoring component configured to assigning each alternate subpath a score that is updated as the alternate subpath is constructed (col.3, ll.55-58; col.2, ll.14-24, ll.44-50) and wherein the path extender is configured to begin construction, in response to receiving the user selected portion of the reference path, of up to a predetermined number, X, of alternate subpaths (see Fig.1). *{1. Fig.1 shows a predetermined number of alternate subpaths.* *2. The score is incrementally added and increased as the alternate subpath is constructed.}*
Claim(s) 38	Tran discloses: The speech recognition system of claim 37 wherein the scoring component is configured to compute an actual score for the alternate subpath through a position to which the alternate subpath is constructed, and compute an estimated score, estimating a score associated with a remainder of the alternate subpath to be computed. (col.5, ll.57-66) *{The score of the reference is computed first. Subsequently, the scores of the alternate subpaths are incrementally computed.}*
Claim(s) 39	Tran discloses: The speech recognition system of claim 38 wherein the path extender is configured to, after beginning construction of each of the X alternate subpaths (Fig.1), continuing construction of an alternate subpath only if its score is one of the top X scores (Fig.3; col.4,

	ll.52-53), and discontinuing construction of all alternate subpaths having a score not in the top X scores (Fig.3). *{1. Fig.1 shows a predetermined number of alternate subpaths.* *2. Fig.3 shows the top 4 sequences.* *3. The alternate subpaths with scores below the top 4 sequences are not constructed.}*
Claim(s) 40	Tran discloses: The speech recognition system of claim 25 wherein the alternative generator is configured to construct alternate subpaths that are lexically different from the reference subpath (Fig.1; col.3, ll.28-63), and when fewer than a predetermined number of lexically different alternate subpaths can be constructed, extending the boundary conditions and constructing alternate subpaths satisfying the extended boundary conditions. (Fig.1) *{K7 is an alternate subpath for K8. The boundary of K7 is extended from t5 to N6. K11 subpath is constructed to satisfy N6 and t6.}*
Claim(s) 41	Tran discloses: The speech recognition system of claim 25 wherein the alternative generator is configured to construct the alternate subpaths in response to the operator selection input. (col.6, ll.36-42)

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent Documents:

[1] 5,634,083 05/1997 Oerder

[2] 5,946,655 08/1999 Steinbiss et al.

[3] 5,613,034 03/1997 Ney et al.

Other Publications :

[4] B.H. Tran et al., "A word graph based N-best search in continous speech recognition," Proc. ICSLP '96, vol.4, pp.2127-2130, 1996.

[5] F. Wessel et al., "Using posterior word probabilities for improved speech recognition," IEEE ICASSP '00, vol.3, pp.1587-1590, June 2000.

[6] F. Wessel et al., "Using word probabilities as confidence measures," Proc. ICASSP '98, vol.1, pp.225-228, May 1998.

[7] F. Wessel et al., "A comparison of word graph and N-best list based confidence measures," Proc. 6th EuroSpeech '99, pp.315-318, Sept. 1999.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tim Lao whose telephone number is 703-305-8955. The examiner can normally be reached on M-F, 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Doris To can be reached on 703-305-4827. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tim Lao

DORIS H. TO
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

Examiner
Art Unit 2655

TL
04/29/04